Executive Summary
Cold Spray Fabrication Workshop
July 14-15, 1999

Cold Spray is an emerging technology developed in the Former Soviet Union in the late 1980's. Small solid particles are accelerated to very high velocities in a compressed gas jet. They impact the target surface with sufficient kinetic energy to weld themselves to that surface without melting or vaporization. The process permits high-rate deposition of a wide range of metals and some other ductile materials at or near room temperature without phase changes, grain growth, oxidation, or high residual stresses.

Approximately 25 industry executives, representing leading corporations in the aerospace, transportation, primary metals, and manufacturing sectors attended a recent two-day Cold Spray workshop at Sandia National Laboratories. Several university representatives and executives from small businesses also participated in the workshop.

Dr. Mark F. Smith, manager of the Sandia Thermal Spray Research Laboratory, delivered the opening remarks. Dr. Robert McCune, Ford Motor Company, and Mr. Albert Kay, president of ASB Industries, then presented their perspectives on industrial interest in Cold Spray technology. The co-inventor of Cold Spray, Professor Anatolii N. Papyrin of the Pennsylvania State University, reviewed process history and fundamentals. Ongoing process diagnostics and materials characterization work at Sandia was presented and discussed by Drs. Richard Neiser and Delwyn Gilmore.

A tour of the Thermal Spray Research Laboratory, which included a demonstration of the Cold Spray process depositing copper on an aluminum substrate, provided an excellent opportunity to observe the process in operation. During this tour, work on process modeling was also presented, which provided additional insight into process fundamentals. The evening was spent in interesting and lively discussion while dining at the Petroleum Club overlooking downtown Albuquerque.

The second day was devoted to the business aspect of the Cold Spray process. This included a discussion of the advantages of forming an industrial partnership to jointly address pre-competitive issues needed to bring Cold Spray out of the laboratory and onto the production floor. An ongoing Sandia/industry consortium for LENS (Laser Engineered Net Shapes) was used as a model to illustrate how partnering works in a development environment and how that might relate to Cold Spray.

The day ended with small group discussions aimed at identifying potential commercial opportunities for Cold Spray and issues for commercialization. Numerous commercial opportunities, spanning a broad spectrum of industries, were listed. There remain, however, some fundamental technical challenges in the process, equipment, and materials areas that need to be addressed. Specific areas for additional work were identified.

The workshop ended with the formation of a four-person industry team that will work with Sandia representatives to provide leadership and direction toward pursuing further

collaborative development efforts and perhaps to pursue government funding for additional research in this important emerging technology.

Those interested in learning more about Cold Spray technology may be interested in attending a technical session on Cold Spray that will be held as part of the ASM Materials Solutions conference in Cincinnati, November 1-4, 1999.

For additional information, please contact Dr. Mark F. Smith, Sandia National Laboratories, Ph: 505-845-3256, e-mail: mfsmith@sandia.gov.